



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/645,968

08/22/2003

Masaaki Arai

WAM-04501

8390

7590

01/20/2006

MUIRHEAD AND SATURNELLI  
200 FRIBER PARKWAY  
SUITE 1001  
WESTBOROUGH, MA 01581

EXAMINER

DOUGHERTY, THOMAS M

ART UNIT

PAPER NUMBER

2834

DATE MAILED: 01/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/645,968	ARAI ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Thomas M. Dougherty	2834	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 24 October 2005.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

**DETAILED ACTION*****Response to Arguments***

Applicant's arguments filed 10/24/05 have been fully considered but they are not persuasive. The applicants' contention that the crystal blank of Morita or Satoshi fails to show "a single fixed end electrically and mechanically connected to the casing" is disputed. In Morita's (4-35107) figures 2a and 2b the crystal is clearly connected mechanically at the left end. It is further clearly connected to electrode 21 at that point. It also is clear from the figure that the electrode (18) which covers the full face of the bottom of the crystal blank, is also electrically connected to 21 by the bond or else the lower full face electrode 18 fulfills no purpose. Figure 4b likewise shows electrode 21 connected at position 22 to the full face electrode 18. In that figure, the only purpose of electrode 21 is to supply a voltage level to the underside of the crystal blank, while another electrode (26) supplies a voltage level to the top electrode 19. Note also that electrodes 6 and 7 are connected by wire bonding to at positions 29 and 30.

***Claim Rejections - 35 USC § 103***

Claims 1, 2, 3, 5-8, 10-14 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morita et al. (JP 4-35107) in view of Satoshi et al. (JP 2001-110264). Morita et al. show (e.g. fig. 2a, 2b) a crystal unit comprising: a crystal blank having a hole portion defined in at least one principal surface (the bottom surface) thereof, providing a vibrating region in a portion of the crystal blank which is made thinner by the hole portion; excitation electrodes (6) disposed respectively on opposite principal surfaces of the crystal blank in said vibrating region; extension electrodes (connected to

Art Unit: 2834

33, 34, 36 and solder point on 21), to respective first and second positions on an outer peripheral portion of said crystal blank; and a casing (20); wherein said crystal blank has a fixed end electrically and mechanically connected to said casing at said first position and extension electrodes [is] is electrically connected to said casing by wire bonding in said second position (see fig. 2b and note wire connection at 36).

Said crystal blank has a free end in said second position.

Said crystal blank comprises an AT-cut quartz crystal blank (see CONSTITUTION) having a substantially rectangular (see fig. 2a) planar shape, said first position is on an end of said AT-cut quartz crystal blank, and said second position is on another end of said AT-cut quartz crystal blank which is opposite to said end of said AT-cut crystal blank.

Morita et al. show (figs. 2a, 2b) a structure for holding a crystal blank having a hole portion defined in at least one principal surface thereof, providing a vibrating region in a portion of the crystal blank which is made thinner by the hole portion; said crystal blank supporting thereon excitation electrodes (6) disposed respectively on opposite principal surfaces of the crystal blank in said vibrating region, and extension electrodes (connected to 33, 34, 36 and 21) extending respectively from said excitation electrodes (96) to respective first and second positions on an outer peripheral portion of said crystal blank; said crystal blank having a fixed end electrically and mechanically connected to a holder (surface of 21) in said first position; said crystal blank having a free end on which wire bonding wires are connected (plurality of wires is clearly shown in figure 2a) are connected to extension electrodes in said second position.

Said crystal blank comprises an AT-cut quartz crystal blank (again see CONSTITUTION) having a substantially rectangular planar shape.

Said first position is on an end of said AT-cut quartz crystal blank (on 21) and said second position is on another end of said AT-cut quartz crystal blank which is opposite to said end of said AT-cut quartz crystal blank.

Morita et al. show (1A, 1b, 2a, 2b, 5a) a crystal unit comprising: a crystal blank (14) having a hole portion (15) defined in at least one principal surface thereof, providing a vibrating region in a portion of the crystal blank (14) which is made thinner by the hole portion (15); excitation electrodes (6, 7) disposed respectively on opposite principal surfaces of the crystal blank (14) in said vibrating region; extension electrodes ((31, 32) extending respectively from said excitation electrodes (6, 7) to respective first and second positions (33, 34) on an outer peripheral portion (17) of said crystal blank (14); and a casing (20), wherein said crystal blank (14) has a single fixed end (left end) electrically and mechanically connected to said casing (20) in said first position.

Said extension electrodes (31, 32) are electrically connected (see for example connections 36) to said casing by wire bonding in said second position.

Said crystal blank (14) has a free end in said second position (as shown, the area around 36 is free).

Said crystal blank (14) comprises an AT-cut quartz crystal blank having a substantially rectangular planar shape, said first position is on an end of said AT-cut quartz crystal blank (14) as noted, and said second position (as noted) is on another

Art Unit: 2834

end of said AT-cut quartz crystal blank which is opposite to said end of said AT-cut quartz crystal blank (14).

Morita et al. don't note eutectic bonding.

Satoshi et al. show (drawing 1) a crystal unit comprising: a crystal blank having a hole portion defined in at least one principal surface (both the top and bottom surface) thereof, providing a vibrating region in a portion of the crystal blank (1) which is made thinner by the hole portion; excitation electrodes (3a, 3b) disposed respectively on opposite principal surfaces of the crystal blank (1) in said vibrating region; extension electrodes (4a, 4b), to respective first and second positions on an outer peripheral portion of said crystal blank (1); and a casing (2a, 2b); wherein said crystal blank (1) has a fixed end electrically and mechanically connected to said casing by eutectic alloy in said first position (see SOLUTION) and extension electrodes [is] is electrically connected to said casing.

Their eutectic alloy comprises an alloy selected from the group consisting of AuSn, AuGe, and AuSi. See page 3 paragraph 17 of the DETAILED DESCRIPTION.

Satoshi et al. show (drawing 1) a structure for holding a crystal blank having a hole portion defined in at least one principal surface thereof, providing a vibrating region in a portion of the crystal blank which is made thinner by the hole portion; said crystal blank supporting thereon excitation electrodes (3a, 3b) disposed respectively on opposite principal surfaces of the crystal blank in said vibrating region, and extension electrodes (4a, 4b) extending respectively from said excitation electrodes (3a, 3b) to respective first and second positions on an outer peripheral portion of said crystal blank

Art Unit: 2834

(1); said crystal blank (1) having a fixed end electrically and mechanically connected to a holder (surface of 2b via eutectic alloy solder) in said first position;

Satoshi et al. don't show their second end connected to the casing by wire bonding. They do not show a free end. They don't define a cut for their crystal.

It would have been obvious for one of ordinary skill in the art to employ the eutectic alloy of Satoshi et al. in the device of Morita at the time of that invention in order to achieve a matching of transition point of the alloy and the crystal as Satoshi et al. note in their p. 3 para. 17 description. Additionally, such a laminated design results in improved productivity as Saroshi et al. note in their PROBLEM TO BE SOLVED section.

Recitation of the frequency at which the crystal blank is to be operated is intended use of the device. It has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. Ex parte Masham, 2 USPQ2d 1647 (1987).

Claims 4 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morita et al. (JP 4-35107) in view of Satoshi et al. (JP 2001-110264) further in view of Nippon (JP 2001-237665). Given the combined invention of Morita et al. and Satoshi et al. neither shows a pillow member mounted on the casein, said free end being placed on said pillow.

Nippon shows (figs. 1-4) show (e.g. fig. 2a, 2b) a crystal unit comprising: a crystal blank providing a vibrating region in a portion of the crystal blank; excitation electrodes (7) disposed respectively on opposite principal surfaces of the crystal blank

Art Unit: 2834

in said vibrating region; extension electrodes (8), to respective first and second positions on an outer peripheral portion of said crystal blank; and a casing (3, 4); wherein said crystal blank has a fixed end electrically and mechanically connected to said casing at said first position (at area of 9) and extension electrodes [is] electrically connected to said casing

Said crystal blank has a free end in said second position.

Nippon further shows a pillow member (6) mounted on the casing, said free end being placed on said pillow (6).

Nippon doesn't show a hole portion defined in at least one principal surface thereof, or wire bonding.

It would have been obvious to one having ordinary skill in the art to employ the pillow of Nippon in the combined device of Morita et al. and Satoshi et al. at the time of either invention in order to allow the device to maintain a level crystal at opposite ends of the contained base, which also allows for mitigation of problems related to such during storage. See the NOVELTY and USE sections especially in the Nippon document.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not



Art Unit: 2834

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Direct inquiry to Examiner Dougherty at (571) 272-2022.

tmd  
tmd

January 17, 2006

Thomas M. Dougherty  
TOM DOUGHERTY  
PRIMARY EXAMINER